

The Davison Freeway from
M-10 to Oakland Avenue,
Brush Street Bridge Spanning Davison Freeway
Highland Park
Wayne County
Michigan

HAER No. MI-103-G

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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Great Lakes Systems Office
Department of the Interior
1709 Jackson Street
Omaha, Nebraska 68102-2571

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Location: Brush Street Spanning the Davison Freeway,
Highland Park, Wayne County, Michigan

Quad: Highland Park, Michigan 1:24,000

UTM: 17.328040.4696720

Date of Construction: 1942

Engineers: Julian C. Meade, Engineer of Structural Design; and Harry A. Shuptrine, Engineer of Bridges and Structures, Wayne County Road Commission.

Builder: William J. Storen Company

Present Owner: Michigan Department of Transportation,
425 West Ottawa Street
Lansing, Michigan 48909

Present Use: Vehicular and pedestrian bridge, to be replaced by a new bridge at the same location.

Significance: One of four identical single-span bridges designed to carry major north-south arterial streets over the Davison Limited Highway, built to speed crosstown traffic through Highland Park. The others were at Third Avenue, Second Avenue, and John R Street. The hinged, reinforced concrete, rigid-framed bridge design permitted maximum underclearance without raising the grade of the street above. The steel reinforcing bars were bent on site, instead of in fabricating shops.

Historian: Charles K. Hyde, Wayne State University,
Detroit, Michigan 48202, May 1996.

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DESIGN AND CONSTRUCTION

This hinged, reinforced concrete, rigid-framed bridge design was used because it permitted maximum underclearance without raising the grade of the streets crossing above. The Third Avenue deck slab is only 1 foot 9.50 inches thick at the crown, 5 feet 9 inches at the abutments, and provides a minimum underclearance of 14 feet next to the abutments. While the bridge was under construction, braces made up of railroad rails were built into the bottom segment of the abutments to prevent the abutments from overturning before the deck slab was poured. Once the deck slab was sufficiently solid, the braces were burned away.

Under normal circumstances, the steel reinforcing bars which extend up the back of the bridge abutments and out into the deck slabs would have been bent in the steel fabricating shop and then placed within the forms before the concrete was poured. But the bars needed for this single-span bridge, which had a clear length of 77 feet 4 inches, were too long (29 feet and 29 feet 9 inches) to transport through city streets without special permits. Instead the steel was shipped as straight bars, encased in the concrete abutments, and then bent over a templet into the required shape.¹

In mid-September 1941, the Road Commission asked for bids for four identical bridges at Third, Second, John R, and Brush. They awarded the contract on 21 November to the William J. Storen Company, in the amount of \$290,322. The William J. Storen Company first appeared in the Detroit city directories as an independent contractor in 1939. Previously, Storen was listed as a vice president of the Cooke Contracting Company. For the Third and Second Avenue bridges, Storen built only half of each bridge at a time, keeping the bridge open during construction. To save construction time, the Road Commission had Storen build the Brush Street bridge in one stage, while leaving John R open. Once the Brush Street was reopened, then Storen entirely closed John R Street and built the bridge there all at once. The contractor completed the Third, Second, and Brush Street bridges in mid-April 1942 and finished the John R bridge by early July.²

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DESCRIPTION

The reinforced concrete deck slab, which supports a 3.50 inch wearing surface, measures 96 feet 8 inches wide, 87 feet 1 inch long, and varies in thickness from 1 foot 9.50 inches at the crown to 5 feet 9 inches on the ends. It rests on a pair of reinforced concrete abutments with triangular cross-sections, one at each end, and these in turn rest on reinforced concrete footings. The abutments are 14 feet 4.50 inches high, 5 feet 9.25 inches wide at the top, 2 feet wide at the base, and extend the full width of the deck slab. The footings are 15 feet wide and range from 5 feet to 3 feet in height. The bridge has a clear span of 77 feet 4 inches. A median 6 feet wide created by a 6-inch raised curb and 4-inch raised curbs near the abutments, each 2 feet 8 inches wide, reduces the clear width of the depressed roadway to a total of 66 feet, divided into two pavements of 33 feet.

Each of the four corners of the bridge is defined by a large truncated pyramid or pylon of reinforced concrete extending from below the surface level of the depressed central roadway to approximately 5 feet above the road surface on the bridge proper. The slightly-curved pylons are then continued by longer, but thinner curved wing walls, also of reinforced concrete, which continue the bridge railing and establish the edge of the service road turning lane. The pylons and wing walls cover 78 degrees of a 90 degree turning radius.

The pylons are 21 feet 4 inches high, with a face measuring 8 feet long on the arc, and range in width from 2 feet 1 inches adjoining the railing post to 1 foot 6 inches at the edge of the wing wall. The wing walls range in height from 18 feet 10 inches at the edge of the pylons to 12 feet 8 inches at the ends. Each rests on footings with widths approximately half the height of the wall. Each wing wall measures 28 feet on the arc of the front face and is 1 foot 4 inches thick. The inside facing of the southeast pylon has a standard stone name plate (22 X 14 inches), with the names of the Wayne County Road Commissioners. The pylons and wing walls have decorative fluting (grooves) on their inside and outside facings. The grooves are 3 inches wide at the surface, 1.50 inches deep, and tapered to 2.50 inches wide at depth. Each pylon has three grooves, all 3 feet 6 inches long, while each wingwall has three grooves extending its entire height.

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The bridge deck is divided symmetrically into distinct segments. The railings are anchored in a 9-inch raised curb which is 3 feet 4 inches wide and extends the length of the bridge along the east and west edges of the deck. Turning lanes 15 feet wide adjoin the railing curb on both side of the deck. The edges of the turning lanes are defined by a pair of raised islands 8 inches high and 10 feet wide. These safety islands keep traffic in the turning lanes separated from traffic on Brush Street and serve as sidewalks for pedestrians crossing the bridge. Since the relocation of the Davison north service drive in 1994, the turning lanes have been blocked by large concrete barriers. The middle of the bridge is a 40-foot wide roadway, divided into three traffic lanes, including a turning lane for traffic making a left-hand turn to use the service drives.

The two bridge railings are identical and consist of symmetrical panels of welded square steel posts, rails, and spindles. Each railing is comprised of 9 panels, each 9 feet 8.25 inches long, for a total length of 87 feet 2.25 inches. The posts for each panel are 3 feet 2 inches tall and 7 inches square, with a 5 inch square cap. Each post has three parallel vertical ornamental fillets on the side facing the crossing street. Each fillet is 0.75 inch wide and 0.375 inch deep; the one in the center is 30 inches long, flanked by two shorter fillets, each 26 inches long. The end posts, which abut the concrete pylons, are 7 inches wide at the base, 12.50 inches wide at the top, and 9 inches thick.

The top and bottom rails each consist of two welded rectangular bars, one 2.25 inches wide and 1 inch high, which meets the 1 inch square horizontal posts in each panel and an outer bar 3 inches wide and 2.25 inches high. The bottom rail is 5.50 inches above the curb, while the top rail is 2 inches below the top of the post. Each panel includes 10 clusters of 3 spindles, each 1 inch square and 2 feet 0.50 inches long, with 2 inch spacing within each cluster, but 3.50 inch spacing between clusters. The pattern is continued without interruption through the length of the panel.

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NOTES

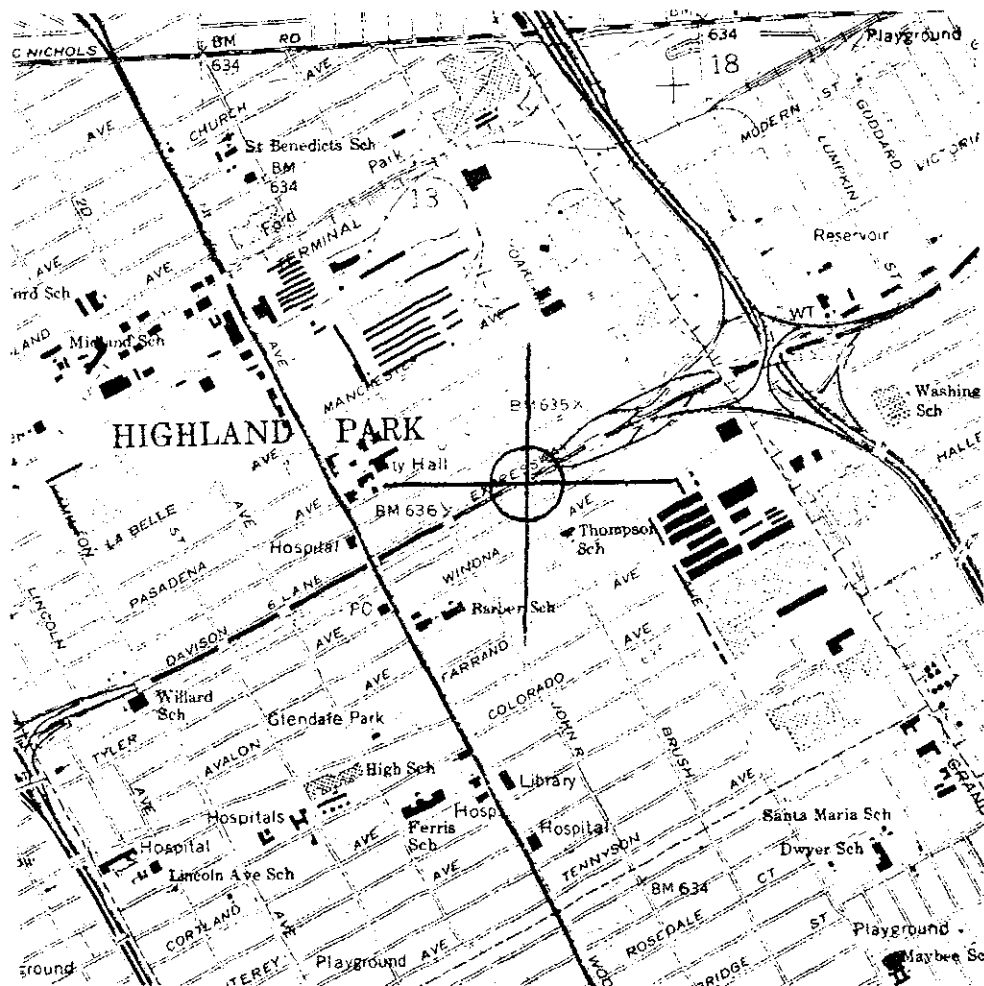
¹J.C. Mead, "The Davison Limited Highway," Proceedings of the Twenty-Ninth Annual Highway Conference, Held at the University of Michigan February 10 to 12, 1943, 61-62.

²Polk's Detroit City Directory (Detroit: R.L. Polk & Company, 1928-1942); "New Plans Speed Work on Highway, County Proposal Wins Approval of Council," The Highland Parker, 8 January 1942; "Four Davison Highway Bridges 50 Per Cent Completed," Michigan Roads and Construction 39 (19 February 1942): 2; and "Open Brush, Third Bridges On Davison, Second Avenue Will Be Opened This Weekend," The Highland Parker, 9 April 1942. Contract details are found in the vertical files in the engineering offices of the Wayne County Department of Public Services.

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HIGHLAND PARK, MICHIGAN QUADRANGLE, 1:24,000

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SITE PLAN

